

Section 7.0 Recreational Water	Page 1 of 4
Subsection 7.5 Pool Contamination	Revised May 2008

POOL CONTAMINATION

All patrons (including infants) should be required to wear bathing briefs as a large number of diseases are transmitted through human fecal accidents. An oxidation reduction potential (ORP) of 860mV for 20 minutes is reported to produce a 99% oocyst reduction of *Cryptosporidium*, as will an ORP of 800mV over 2 hours (3 mg/L free chlorine at pH 7.2). It is good practice to "super disinfect" (superchlorination to 10 mg/L) overnight on a weekly basis to overcome possible resistance development and to kill most cysts that may be introduced into the pool.

If a case of cryptosporidiosis or a loose stool occurs in a pool disinfection of the pool water and plumbing system should be undertaken to equal CT 9600. Where disinfectant concentration-C multiplied by time-T equals 9600.

All persons should be encouraged to use toilet and shower facilities before entry into the pool. Persons detected with open wounds, sores and rashes, infected eyes, or wearing bandages should be requested not to swim in the pool. Pool contamination through nose blowing, spitting and spouting of water should be actively discouraged.

Each pool premises should determine its attitude toward the control or possible exclusion of incontinent persons who might use the pool. Pool disinfection systems are not designed to accept or disinfect fecal material. However, a suitable management plan may need to be devised for specific pools, such as hydrotherapy pools frequented by special groups such as incontinent and/or immuno-compromised persons. Suitable signs should be erected near the main entrance.

The pool should be maintained in a clean condition, free from debris, and floating materials by frequent vacuuming and skimming. Walls, floors, overflow weirs and scum gutters should be kept free from debris, body grease and algal blooms. No animals except guide dogs assisting blind persons should be permitted on the pool premises.

EMERGENCY CONTAMINATION MANAGEMENT

If a substantial amount of **loose runny stool (diarrhea)** is introduced into the pool:

- the pool should be cleared of people,
- the fecal material should be removed as thoroughly as possible using a fine mesh,
- add a coagulant,
- superchlorinate to CT 9600
- thoroughly vacuum the pool,
- backwash the filter, and
- enter all relevant details on the log sheet.

When a **solid stool** is introduced into the pool the immediate vicinity should be evacuated. The stool should be removed as soon as possible and a check made of disinfectant levels in the vicinity. Where disinfectant concentration is low the pool should be closed for one pool turnover. Where disinfectant levels are satisfactory allow swimming to continue.

Where **blood or vomit is introduced into a pool** it should be temporarily cleared and the contamination dispersed until there is no further trace. Tests for disinfectant levels should be satisfactory before allowing people to swim.

Blood spillage on the poolside should not be washed into poolside drains. It should be neutralized with a 1% chlorine solution (household bleach or a 10:1 dilution of sodium hypochlorite) for two minutes before being washed away.

FREQUENCY OF TESTING

For continuous non-automatic control dosing systems, test the following prior to opening and every two hours:

- Free Chlorine,
- Total Chlorine (Combined Chlorine),
- Total Bromine,
- pH, and
- Polyhexamethylene biguanide

For automatic control dosing, test the following prior to opening and then once during the day to confirm automatic readings. (Automatic readings should be logged every four hours).

- Free Chlorine,
- Total Chlorine (Combined Chlorine),
- Total Bromine,
- pH, and
- Redox Potential

The following daily:

- Ozone and
- Reserve (Total) Alkalinity

The following weekly:

- Isocyanuric Acid,
- Clarity,
- Water Balance,
- Bromide (Sodium bromide systems),
- Total Dissolved Solids, and
- Bacteriological Sampling (first two months)*

Section 7.0 Recreational Water	Page 1 of 4
Subsection 7.5 Pool Contamination	Revised May 2008

The following monthly:

- Bacteriological Sampling (after first two months)*

***NOTE: Bacteriological testing of treated pools is more often than not inconclusive in determining proper, safe and healthy operation. Time, effort and money is usually better spent ensuring proper oxidizing and sanitizing chemical levels are maintained at proper levels in a chemically balanced pool. Bacteriological testing for treated pools that are suspect in causing illness is relevant and can be used to diagnose pool operation deficiencies.**

SAMPLING LOCATION

Water samples for testing **all chemical parameters except ozone** should be collected immediately prior to carrying out the test. Water should be sampled from a depth of at least 1 foot using an inverted plastic beaker in a location representing a point **furthest** from inlets, or by assessment of various locations to determine the area of lowest readings.

Water samples for testing **ozone** should be collected immediately prior to carrying out the test. Water should be sampled from a depth of at least 1 foot using an inverted plastic beaker in a location representing a point **closest** to an inlet.

Samples for confirming automatic control dosing should be taken from a sample tap strategically located on the return line as close as possible to the probes in accordance with the manufacturers instructions. As the difference between manual pool readings and automatic control measurements will vary, it is the consistency of variation that is paramount. Diverging or converging readings should be investigated.

Bacteriologic samples should be collected prior to its complimentary chemical parameter sampling. (Note: Bacteriological samples must be collected in sterile containers containing sodium thiosulphate and during times of high bather load.)

TESTING APPARATUS

Suitable testing apparatus shall be used to ensure accurate results. Fresh reagents sealed in foil and in accordance with manufacturers specifications should be purchased just prior to the swimming season or at least once a year. All glassware and plasticware should be thoroughly washed and rinsed after each testing session. The test methodology specified by the manufacturer of the test kit should be strictly followed. Liquid testing reagents must be stored in sealed containers. Test kits using orthotolidine as a reagent to determine chlorine or bromine have been withdrawn from sale because of the carcinogenic properties of the reagent.

The following test methods are considered suitable:

a). Chlorine / Bromine

- A colorimetric comparison method based on DPD reagents using standards capable of measuring to 0.2 mg/L units within the recommended disinfectant range; or
- A photometric method based on DPD reagents capable of measuring to 0.2 mg/L units within the recommended disinfectant range.

b). Polyhexamethylene biguanide ("Baquacil®")

- Aquaswim Pty Ltd markets the only test kit available.

c). Ozone (Note: This method is still under development as chlorine and bromine may interfere with the result - the supplier should be consulted for appropriate methodology.)

- A colorimetric comparison method based on DPD reagents using standards capable of measuring to 0.1 mg/L; or
- A photometric method based on DPD reagents capable of measuring up to 0.1 mg/L.

d). Hydrogen Peroxide

- A colorimetric comparison method based on potassium iodide under acidic conditions using standards and capable of measuring to within 10 mg/L within the range of 0 - 100 mg/L; or
- A photometric method based on potassium iodide under acidic conditions and capable of measuring to within 10 mg/L within the range of 0 - 100 mg/L.

e). pH

- A photometric method capable of measuring to 0.1 pH units; or
- A pH meter; or
- A colorimetric method capable of measuring to 0.2 pH units.

f). Total Alkalinity

- Titration method using an appropriate indicator (and sodium thiosulphate where elevated chlorine concentrations are detected).

g) Isocyanuric Acid

- Any test kit available.

h). Clarity

- There is no test specified at this time for water clarity. Water clarity should be maintained so that lane markings or other features on the pool bottom at its greatest depth are clearly visible when viewed from the side of the pool.

NOTE: Analytical multi chemical parameter dipsticks are currently widely used in the pool industry. Though these tests may not be as accurate as some of the above-mentioned methods they do provide ample confidence to use as a screening tool for chemical balance and due to their ease of use encourage regular testing.